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FINAL REPORT

Evaluation of Orthene Medicap Trunk Implants for
Protecting Grand Fir and Douglas-fir From Defoliation
by the Western Spruce Budworm

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Activity Number: 4.2.3 New Chemical Insecticides

Logged in	10-26-79		
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Summary:

Orthene Medicap trunk implants reduced western spruce budworm populations and protected foliage on grand fir and Douglas-fir. The treatments were effective for both tree heights (25 and 50 ft) and three timings (tight bud, bud swell, and bud burst).

Introduction:

In western North America the western spruce budworm is the most persistent and, over a long period of time, the most serious defoliator of the western fir forests.

The major research and development effort for chemical control of the western spruce budworm has been aerial application strategies to control infestations covering large areas. Conditions can exist where aerial application is not appropriate, such as where protection from defoliation is desired for aesthetic reasons, in urban areas, in recreation areas, or where aerial application may be potentially harmful to some aspect of an adjacent area.

Preliminary experiments to determine the effectiveness of Orthene Medicap trunk implants for control of defoliators have shown these implants compare favorably to ground application or trunk injection with the potential for reducing or eliminating the adverse trunk-wound response.

The objectives were to determine: (1) effectiveness of Orthene Medicap trunk implants in preventing defoliation and in reducing populations of western spruce budworm on grand fir and Douglas-fir,

(2) efficacy of Orthene Medicaps when implanted in 25 and 50 foot grand fir and Douglas-fir, (3) efficacy of Orthene Medicaps when implanted at 3 timings (prior to bud swell, bud swell, and bud burst) in 25 and 50 foot grand fir and Douglas-fir, and (4) residue levels in this year's foliage for Douglas-fir and grand fir samples taken on 8 monitoring dates: pretreatment, and 10, 28, 38, 48, 66, 84, and 100 days posttreatment.

Methods and Design:

The experiment was a completely randomized design. A total of 120 (60 treatment and 60 control) open-grown trees of each species were randomly selected throughout several drainages. There were 10 treated and 10 untreated trees for each variable tested: two tree heights (25 ± 5 and 50 ± 5 ft) and three treatment timings (tight bud, bud swell and bud burst) for two tree species (grand fir and Douglas-fir).

Orthene, as 85% acephate, was directly introduced into the phloem tissue of a tree by way of Medicap trunk implants. A dosage of one Orthene Medicap implant per 4 inches of trunk circumference was applied to each tree trunk at about 1 foot above ground and root flares where possible.

Larval population densities were determined for groups of treated and corresponding check trees one day before treatment and 10, 28, 38, 48, 66, 84, and 100 days after treatment. The sampling procedure consisted of counting the number of larvae and buds on two 15-inch branches removed from mid-crown of the sample trees at pre-spray and at post-spray timings. Assessment of defoliation was made by examining 25

shoots per branch and estimating the amount of new foliage which was consumed or destroyed by budworm feeding.

Results:

There was a significant (1% level) reduction in numbers of western spruce budworm collected from treated trees as compared to check trees. This population reduction was evident for all 3 stages of bud development (tight, swell and burst), two tree heights (25 and 50 ft), and two tree species (grand fir and Douglas-fir).

There was significantly (5%) less defoliation of new shoots on treated trees as compared to check trees. On the average, new shoots on treated trees were less than 10% defoliated whereas on check trees 40%.

Residue data is not available at this time although approximately 10 days is required for detectable levels of Orthene to move from the implant site (trunk) to mid-crown foliage.

Conclusions:

Orthene Medicap trunk implants are effective in protecting grand fir and Douglas-fir from defoliation by western spruce budworm. Prior to recommending use of trunk implants on high value trees, additional studies are needed concerning wound response (discolored wood and cambial dieback) of grand fir and Douglas-fir implanted for 1, 2 and 3 consecutive years.

Work Not Completed:

A final report concerning residue analysis has not been received from Stoner Laboratories. This report is a critical component of the study and should provide much needed data concerning Orthene levels and movement within trees.

Parasite data was recorded for individual trees and sampling dates; upon analysis it should provide an indication of differences due to tree species and treatment.

Cooperation and Coordination:

- Boise and Payette National Forests

- Max Ollieu

FIDM-Boise Field Office

Boise, Idaho

- Donn Cahill

CANUSA Spruce Budworm Program (West)

Boise, Idaho

Problems Encountered:

Western spruce budworm populations were lower than anticipated, however this did not affect the study design or analysis.

Manuscript Planned:

A manuscript is being prepared for submittal to Journal of Economic Entomology.